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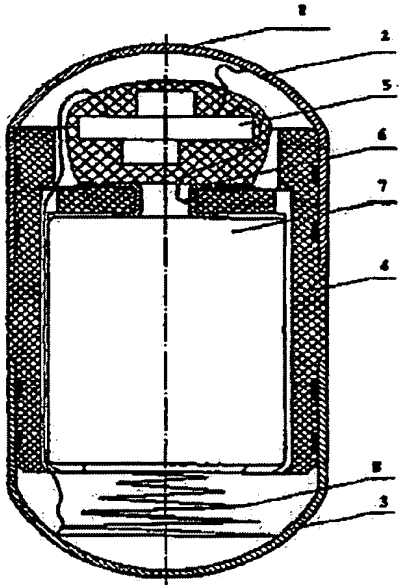
(51) International classification of the invention ⁵ : A61N 1/375, 1/ 06	A1	(11) Number of the international publication WO 97/27900 (43) Date of the international publication: August 7, 1997 (07.08.97)
(21) Number of the international application: PCT/RU96/00023 (22) Date of international filing: January 31, 1996 (31.12.96) (71) (72) Applicants and inventors: KHVOROSTOV Sergei Alexandrovich [RU/RU]; 107594, Moscow, Pogony Proezd 4, Ap. 76 (RU) (72) Inventor and (75) Inventor/Applicant (only for US) KAREV, Vladimir Alexandrovich [RU/RU] 109144, Moscow, Bataisky Proeyd 43, Ap. 213 (RU)		(81) Mentioned countries: CN, JP, KR RU, US, (European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). <i>Published with the report on international search</i>

(54) Titles: **ELECTRONIC NORMALIZER**

(57) **ABSTRACT**

The electronic normalizer pertains to medicine, specifically to the field of autonomous stimulators which can be used, for example, in the treatment of the gastro-intestinal tract, in gynecology for stimulating the bioelectrical, motor and secretory activity of organs, for cleaning duct systems, stimulating the pancreas and prostate gland, modifying psycho-physiological and immune state, prevention and treatment of malignancies and so forth.

The electronic normalizer comprises a casing (1), two electrodes (2, 3), an insert (4), a microprocessor (5), contact element (6), power source (7) and spring (8)



ELECTRONIC NORMALIZER

TECHNICAL DOMAIN

The invention pertains to medicine, specifically to the autonomous stimulators, which can be used, for instance, for the treatment of the gastro-intestinal tract, in gynecology, for stimulation of the bioelectrical, motive and secretory activity of organs, for cleaning duct systems, stimulating the pancreas and prostate glands, etc

The state-of-the-art techniques

Known is a stimulator for the gastro-intestinal tract, where, in order to enable introduction of medicines in the stimulation area, one of the electrodes is fitted with a union shaped as hollow cylinder with holes on its lateral surface intended for connection to a drain tube (USSR Author's Certificate Nr. 1223922, published in 1986).

Its main shortcoming is the hose, connected to the electrical stimulator, which hose does not allow inserting the stimulator to a sufficient depth and excludes the possibility to let the stimulator pass the whole gastro-intestinal tract.

Known is also an electrical stimulator of the gastro-intestinal tract, consisting of two electrodes, which represent two electrically separated parts of a medicinal capsule, housing the pulse shaping device and the power source (USSR Author's Certificate

Nr. 936931, published in 1982).

However, this electrical stimulator features several design drawbacks, which limit its operating reliability, namely, impossibility to introduce into the human body the scarce microelements the capsule casing is made of, low reliability of the multiunit power source, and insufficient operative reliability of the whole device. What is more, the above-mentioned known stimulator does not comprise control and self-regulation means, so its field of application is narrowed.

Revealing the invention

The goal to be achieved by this invention is developing the design of an electronic normalizer (EN), which could provide uniform introduction into the human body of scarce microelements, while featuring increased design reliability and high radiation efficiency of the low-frequency and low-intensity electromagnetic field.

The posed goal is solved by the electronic normalizer comprising electrodes made as two insulated parts of the body of a sealed capsule, accommodating a signal shaping device and a power source, the electrodes being made of metallic or non-metallic current- conducting material with or without microelement coating, the electrodes being separated by an insulating insert, the signal shaping device being a microprocessor and the device having an additional contact element contacting one of the poles of the power source, while the second pole is pressed by a spring connected to one of the electrodes.

The normalizer electrodes, which act as antenna vibrators are asymmetrical, their length ratio being 1:0.75.

Besides, one or both electrodes can be shaped as cones with rounded up tops and lateral corrugations. Ferrite cores may be introduced into the electrode tops.

According to the invention, the processor of the electronic normalizer may additionally comprise a receiver-switch or a timer, intended to switch over the processor to generate output signals of another kind.

The essence of the invention consists in the proposed novel design, which eliminates a number of drawbacks of the former design variants.

Particularly, the design of the electrode-vibrators affords a regular, uniformly distributed input into the human body of the scarce microelements, the electrode tops or their coatings are made of.

The proposed design ensures a reliable contact of the power source poles and also impossibility to dismantle the capsule body assembled and sealed by mechanical gluing.

The signal-shaping device is a processor, which, additionally, takes care for electrode protection against short-circuits and breakdown by static electricity.

The signal-shaping device according to the invention uses a continuous component of the current flow between the electrodes reduced by 2-3 times, this resulting in increased reliability, life and storage time of the electronic normalizer. What is more, the efficiency of the low-intensity and low-frequency electromagnetic field is enhanced.

Owing to the reduced continuous component of the current flow between the electrodes, the proposed EN has an operative life of 150 hours, thus enabling

repeated use of the device with account for the hermetic sealing that provides more reliability as compared with the former design variants.

The application of the proposed EN allows increasing the therapeutic efficiency at treatment of the gastro-intestinal tract, of the neighboring and other hardly accessible organs of the living body. It also permits of efficiently improving the lipids and carbohydrate exchange (metabolism), as well as correcting the neuro-hormonal content and psycho-physiological and immune status of the body.

Brief description of the designs

Fig. 1 represents the design of the electronic normalizer (EN).

Fig. 2 shows one of the implementation variants of the EN with asymmetrical electrodes.

Fig. 3 shows the EN design, where one of the electrodes is shaped as cone with rounded top and lateral corrugations.

Fig. 4 shows an electronic normalizer with ferrite core, receiver-switch and timer.

Figs. 5 through 10 show the shapes of the signals meant for treatment of various diseases.

The best implementation variant of the invention

The electronic normalizer represented in Fig. 1 consists of the capsule body 1, comprising two electrically insulated rounded caps made of current-conducting metallic or non-metallic materials, which act as electrodes 2 and 3.

The electrodes 2 and 3 may be coated with a micro layer of microelements, which are in short supply in the human body, for instance, copper, silver, gold, carbon, iron, zinc, or materials favoring fixation or elimination of microelements or

organic compounds in excess. The electrodes 2 and 3, being separated by the insert 4 glued on, for instance, with Cyacrine 30 glue, are mechanically fastened (center-punched or crimped) and jointly with the insert form a monoblock hermetically sealed body 1, which cannot be dismantled.

The body 1 accommodates the microprocessor 5, flooded with compound and glued to the insulating insert 4; the contact element 6 contacting one of the poles of the power supply source 7 bears against the insert, while the second pole of the power supply source is pressed by the spring 8 in order to ensure reliable contact, the spring being soldered or spot-welded by laser beam to the electrode 3.

The electronic normalizer shown on Fig. 4 comprises additionally two ferrite cores 9 and 10 and the receiver-switch 11.

EXAMPLE

The electronic normalizer operates in the following way: depending on the organ to be treated, the EN is introduced into the patient's body by swallowing or directly into the straight intestine, or into the aperture of the artificial anus, or into the intestine cut or into the vagina.

Let us examine the operation of the EN introduced into the gastro-intestinal tract. After being swallowed, the EN gets into a current conducting acid-base medium causing conductivity changes in the electrical circuit: positive pole – power supply

source 7 - electrode 3 – current conducting medium - electrode 2 – microprocessor 5 – negative pole of the power supply source 7.

The starter operates to start the operating duty, the microprocessor begins to generate a series of signals, which arrive at the electrodes 2 and 3 that contact the intestine walls.

The electrical signals act upon the intestine walls and bring about their reaction as peristalsis waves, which make the EN advance together with the content of the intestine towards its distal sections, where the following series of generated signals cause the process to reiterate.

Owing to the modified inner circuit as compared with the prototype signal shaping device, the microprocessor 5 provides protection against short-circuit and breakdown by static electricity and reduces by 2-3 times the level of the continuous component of the current flow between the electrodes, thus increasing the EN reliability and life time.

The microprocessor can generate signals of a wide variety of shapes. The signal parameters are chosen on the basis of the known methods of diseases treatment by modulated electrical pulses and low-frequency electromagnetic field with account for the coincidence of the positive-phase stimulating pulses of the quasi-static bioelectric natural oscillations of various organs of the human body and with regard to the domestic (Russian) and foreign publications.

The normalizing pulses represented in Fig. 5 are intended for general stimulation of the body, intestine detoxication, improvement of the lipids and carbohydrate

metabolism, restoration of the myelin nerve sheath, removal of intestinal paresis, peristalsis enhancement at atony, immunity correction, improvement of the psychological status, cleaning the pancreas and prostate gland ducts and the urethra system, cleaning the porous kidney and liver structures, stimulation of sexual activity and prophylaxis of oncology diseases.

The normalizing signals represented in Fig. 6 are intended to improve the body resistance to tumors. The pulses shown in Fig. 7 are intended for the treatment of urethra, pancreas and prostate gland ducts, disintegration and elimination of stones from kidneys and urethra and also for stimulating sexual activity.

The pulses shown in Fig. 8 – for cleaning liver and kidney porous structures from pollutants, the ones shown in Fig. 9 – for treatment of thin ductile systems and the ones shown in Fig. 10 for intensification of the activity of vagina secretory zones.

In order to enable switching over the microprocessor to a certain kind of signals, the normalizer is equipped with a receiver-switch integrated into the microprocessor.

One or both electrodes may be shaped as cones with rounded tops and lateral corrugations in order to obtain a non-uniform radiation directivity diagram in the plane parallel to the longitudinal center-line of the device as well as in the plane perpendicular to this center-line. To increase radiation efficiency, the electrodes, which act as antenna vibrators, are fitted with additional ferrite core inductors, which modify the effective antenna length. The spring soldered or spot-welded to the cap (electrode) is intended as special contact element, which bears upon the

separating insert and ensures reliable contact of the poles of the power supply source.

The design of the electrodes, which are shaped as two rounded caps made of current-conducting metallic or non-metallic material, separated from one another by the insulating insert and possibly provided with a coating made of microelements in short supply in the body (for instance, copper, silver, gold), enables achieving atraumatic insertion of the device into the body and uniform input of the scarce microelements into the blood and tissues.

This is achieved owing to the electrochemical effect arising when the current flows between the electrodes via the current-conducting media and tissues of the body.

The device is hermetically sealed and there is no possibility to dismantle it due to its glued design.

Thus, the proposed EN features a higher reliability, resulting from the protection against short circuit and breakdown by static electricity and owing to the reduced by 2-3 times continuous component of the current between the electrodes. The design ensures a reliable contact between the pole of the power supply source, hermetic sealing of the EN, impossibility to dismantle it and increased efficiency of the low-intensity low-frequency radiation of the electromagnetic field.

The above mentioned enhancements of the electronic normalizer improve considerably its operating reliability and its therapeutic efficiency.

CLAIMS

1. Electronic normalizer comprising electrodes shaped as two separated parts of the hermetically sealed body of the capsule accommodating the signal generator and the power supply source, **where** the electrodes are made of metallic or non-metallic current-conducting material coated or not with microelements, the electrodes being separated by an insulating insert, the signal generator being a microprocessor and a contact element being introduced, which contacts one of the poles of the power supply source while the second pole of the power supply source is pressed by a spring connected with one of the electrodes.
2. Electronic normalizer according to claim item 1, **where** the electrodes acting as antenna vibrators are asymmetrical, their length ratio being 1:0.75.
3. Electronic normalizer according to claim items 1, 2, **where** one or both electrodes are shaped as cones with rounded tops and lateral corrugations.
4. Electronic normalizer according to claim items 1, 2, 3, **where** ferrite cores are inserted into the electrode tops.
5. Electronic normalizer according to claim items 1 through 4, **where** a receiver-switch or a timer is additionally included in the capsule.